UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/533,203	03/23/2000	Christopher R. Fairley	81208	9731

7590 02/28/2002

Pillsbury Madison & Sutro LLP
725 S. Figueroa St
#1200
Los Angeles, CA 90017

EXAMINER
SPEARS, ERIC J

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 02/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/533,203	FAIRLEY ET AL.	
	Examiner	Art Unit	
	Eric J Spears	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 18, 30, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18, lines 1 and 2 recites the limitation "said fly lens". There is insufficient antecedent basis for this limitation in the claim.

Regarding Claim 30, claim 30 is written as depending from itself.

Regarding Claim 33, it is unclear as to which filtering step is being refered with "said selectively filtering step".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 7, 8, 9, 24, 26, 28, 29, 30, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krantz (6,248,988) in view of Bishop (6,091,488).

Regarding Claim 1, Krantz teaches a system for inspecting a specimen, comprising: a light energy source 11 (Fig. 1); a multiple element arrangement for receiving light energy from said light energy source 19, 20 (Fig. 1); a lensing/imaging arrangement 23 25 29 (Fig. 1) for receiving light energy from said multiple element arrangement and imparting said light energy to said specimen 35 (Fig. 1); a pinhole mask (252', Fig. 15) for receiving light energy reflected from said specimen through said lensing arrangement and selectively passing said reflected light energy (Col. 13, lines 30-37); and detector array 49 (Fig. 1), 252' (Fig, 15) for receiving light energy from said pinhole mask.

Krantz does not teach the detector array being a time delay and integration charge coupled (TDICCD) device. However, Bishop teaches an optical inspection device using a TDICCD (See Fig. 7, See abstract). Therefore, it would have been obvious to one of ordinary skill in the art to provide a time delay and integration charge coupled device in the device of Krantz, as such devices are well known in the art as shown by Bishop, in order to enable scanning at high speeds without obtaining blur (Col. 6, lines 4-7).

Regarding Claim 4, the modified device of Krantz teaches said light energy source comprises a laser 11 (Fig. 1) and said system further comprises a beam

expander 15 (Fig. 1) which receives light energy from said laser and expands light energy toward said multiple element arrangement.

Regarding Claim 7, the modified device of Krantz teaches said lensing/imaging arrangement comprises: a first lens 23 (Fig. 1) ; a transmitter/reflector 25 (Fig. 1); an objective 29 (Fig. 1); and what appears to be a tube lens 47 (Fig. 1).

Regarding Claim 8, the modified device of Krantz teaches said lensing/imaging arrangement comprises autofocus capability (Col. 4, lines 25-28; Fig. 6).

Regarding Claim 9, the modified device of Krantz teaches said pinhole mask is mounted adjacent to said time delay and integration charge coupled device (Col. 13, lines 33-37).

Regarding Claim 24, Krantz teaches a system for inspecting a specimen, comprising: illumination means 1 (Fig. 1) for generating light energy; multiple element passing means 19, 20 (Fig. 1) for selectively filtering and passing energy received from said illumination means; lensing means 23, 25, 29 (Fig. 1) for imparting light energy onto said specimen 35 (Fig. 1); masking means (252'; Col. 13, lines 30-37) for further selectively filtering and passing energy received from said lensing means; and a detector array 49 (Fig. 1), 252' (Fig. 15) for receiving light energy from said masking means. Furthermore, Krantz teaches using microscopes to image semiconductor wafers (Col. 1, lines 12-14).

Further regarding Claim 24, Krantz does not teach the detector array being a time delay and integration charge coupled (TDICCD) device. However, Bishop teaches an optical inspection device using a TDICCD (See Fig. 7, See abstract). Therefore, it

would have been obvious to one of ordinary skill in the art to provide a time delay and integration charge coupled device in the device of Krantz, as such devices are well known in the art as shown by Bishop, in order to enable scanning at high speeds without obtaining blur (Col. 6, lines 4-7).

Regarding Claim 26, the modified device of Krantz teaches said illumination means comprises a laser and said multiple element passing means comprises a fly lens array 19 (Col. 5, lines 45-49; see Fig. 1).

Regarding Claim 28, the modified device of Krantz teaches said light energy source comprises a laser 11 (Fig. 1) and said system further comprises a beam expander 15 (Fig. 1) which receives light energy from said laser and expands light energy toward said multiple element arrangement.

Regarding Claim 29, the modified device of Krantz teaches said fly lens arrangement comprises a plurality of offset individual lenses (Krantz Fig. 3).

Regarding Claim 30, the modified device of Krantz teaches said fly lens arrangement is substantially aligned with respect to the pinhole mask (Figs 1, 11; Col. 13, lines 30-37).

Regarding Claim 31, the modified device of Krantz teaches said lensing/imaging arrangement comprises: a first lens 23 (Fig. 1) ; a transmitter/reflector 25 (Fig. 1); an objective 29 (Fig. 1); and a tube lens 47 (Fig. 1).

Regarding Claim 32, Krantz teaches a method for inspecting a specimen, comprising the steps of generating light energy by a light energy source 1 (Fig. 1); selectively filtering and passing energy received from said illumination means using a

multiple element arrangement 19, 20 (Fig. 1); imparting light energy onto said specimen 35 (Fig. 1); further selectively filtering and passing energy reflected from said specimen by a pinhole mask (252'; Col. 13, lines 30-37); and light energy received from said further selectively filtering step.

Krantz does not teach performing a time delay and integrating step. However, Bishop teaches an optical inspection device using a TDICCD (See Fig. 7, See abstract). Therefore, it would have been obvious to one of ordinary skill in the art to provide a time delay and integration charge coupled device in the device of Krantz, as such devices are well known in the art as shown by Bishop, in order to enable scanning at high speeds without obtaining blur (Col. 6, lines 4-7).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 12-15, and 17-20 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Krantz (6,248,988) in view of Kerstens et al. (5,248,876).

Regarding Claim 12, Krantz teaches a specimen inspection system, comprising: a light energy source 11 (Fig. 1); a multiple element arrangement for receiving energy from said energy source and selectively passing the light energy received 19 (Fig. 1); a lensing arrangement 23, 25, 29 (Fig. 1) comprising an autofocus system 20, 252', 140, 142 (See Fig. 6; Col. 6, lines 37-39) for measuring and canceling topographical variations during inspection; and a pinhole mask (252'; Fig. 15; Col. 13, lines 30-37) for filtering light energy received from said lensing arrangement (Col. 3, line 45 – Col. 4, line 7). Krantz teaches the confocal microscope for detection of flaws or particles on specimens (Col. 1, lines 12-14; Col. 7, lines 4-11). Krantz also teaches measuring at multiple two dimensional image planes to build up a three dimensional image of the specimen (Col. 10, lines 54-60). Hence, it is inherent that the device of Krantz teaches measuring the topography of the specimen. However, if not so, the confocal imaging system of Kerstens teaches measuring optical features on a specimen and measuring its topography (Col. 9, lines 55-59), and it would have been obvious to one of ordinary skill in the art to use the confocal microscope of Krantz to measure surface topography during inspection, in order to detect three dimensional defects or dust on specimens.

Regarding Claim 13, Krantz teaches said lensing arrangement receives light energy from said multiple element arrangement and imparts light energy onto a specimen 35 (Fig. 1).

Regarding Claim 14, Krantz teaches said lensing arrangement further transmits light energy reflected from said specimen to said pinhole mask (See Fig. 1).

Regarding Claim 15, the modified device of Krantz teaches said illumination means comprises a laser and said multiple element passing means comprises a fly lens array 19 (Col. 5, lines 45-49; see Fig. 1).

Regarding Claim 17, the modified device of Krantz teaches said light energy source comprises a laser 11 (Fig. 1) and said system further comprises a beam expander 15 (Fig. 1) which receives light energy from said laser and expands light energy toward said multiple element arrangement.

Regarding Claim 18, the modified device of Krantz teaches said fly lens arrangement comprises a plurality of offset individual lenses (Krantz Fig. 3).

Regarding Claim 19, the modified device of Krantz teaches said fly lens arrangement is substantially aligned with respect to the pinhole mask (Figs 1, 11; Col. 13, lines 30-37).

Regarding Claim 20, the modified device of Krantz teaches said lensing/imaging arrangement comprises: a first lens 23 (Fig. 1) ; a transmitter/reflector 25 (Fig. 1); an objective 29 (Fig. 1); and a tube lens 47 (Fig. 1).

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krantz (6,248,988) in view of Kerstens et al. (5,248,876) in view of Bishop (6,091,488).

Regarding Claim 21, the modified device of Krantz does not teach the detector array being a time delay and integration charge coupled (TDICCD) device. However,

Bishop teaches an optical inspection device using a TDICCD (See Fig. 7, See abstract). Therefore, it would have been obvious to one of ordinary skill in the art to provide a time delay and integration charge coupled device in the device of Krantz, as such devices are well known in the art as shown by Bishop, in order to enable scanning at high speeds without obtaining blur (Col. 6, lines 4-7).

Regarding Claim 22, the modified device of Krantz teaches said pinhole mask is mounted adjacent to said time delay and integration charge coupled device (Col. 13, lines 33-37).

Regarding Claim 23, the modified device of Krantz does not teach a focusing lens as recited in Claim 10. However, Kerstens teaches a focusing lens 308 (Fig. 11), wherein said focusing lens receives light energy from a pinhole mask 306 (Fig. 11) and focuses light energy onto a sensor array 116 (Fig. 11)(Col. 9, lines 60-68). Therefore, it would have been obvious to one of ordinary skill in the art to provide a focusing lens as taught by Kerstens in the modified device of Krantz, as focusing lens are well known in the art, in order to better detect light from individual pinholes on respective detector elements.

Claims 2, 5, 6, 10, 11, 25, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krantz (6,248,988) in view of Bishop (6,091,488) and further in view of Kerstens et al. (5,248,876).

Regarding Claims 2 and 11, the modified device of Krantz teaches the multiple element arrangement comprises a fly lens array 19 (Col. 5, lines 45-49). The modified

device of Krantz teaches the light source being a laser, which would have a finite pulse width, but the modified device of Krantz does not teach the light source is a laser emitting light packets at more than one peak frequency. However, Kerstens teaches taking images in different spectral bands simultaneously (See Abstract). Therefore, it would have been obvious to one of ordinary skill in the art to provide a laser emitting at two frequencies in the modified device of Krantz, as such confocal imaging technique is well known in the art as shown by Kerstens, in order to defects of different reflective natures.

Regarding Claim 5, the modified device of Krantz teaches said fly lens arrangement comprises a plurality of offset individual lenses (Krantz Fig. 3).

Regarding Claim 6, the modified device of Krantz teaches said fly lens arrangement is substantially aligned with respect to the pinhole mask (Figs 1, 11; Col. 13, lines 30-37).

Regarding Claim 10, the modified device of Krantz does not teach a focusing lens as recited in Claim 10. However, Kerstens teaches a focusing lens 308 (Fig. 11), wherein said focusing lens receives light energy from a pinhole mask 306 (Fig. 11) and focuses light energy onto a sensor array 116 (Fig. 11)(Col. 9, lines 60-68). Therefore, it would have been obvious to one of ordinary skill in the art to provide a focusing lens as taught by Kerstens in the modified device of Krantz, as focusing lens are well known in the art, in order to better detect light from individual pinholes on respective detector elements.

Regarding Claim 11, the modified device of Krantz does not teach a slit laser. However, Bishop teaches a slit laser (Col. 8, lines 7-11). Therefore, it would have been obvious to one of ordinary skill in the art to provide slit lasers in the modified device of Krantz, as such slit lasers are well known in the art as shown by Bishop, in order to enable linear scanning.

Regarding Claims 25 and 33, the modified device of Krantz teaches the confocal microscope for detection of flaws or particles on specimens (Col. 1, lines 12-14; Col. 7, lines 4-11). Krantz also teaches measuring at multiple two dimensional image planes to build up a three dimensional image of the specimen (Col. 10, lines 54-60). Hence, it is inherent that the device of Krantz measures the topography of the specimen. However, if not so, the confocal imaging system of Kerstens teaches measuring optical features on a specimen and measuring its topography (Col. 9, lines 55-59), and it would have been obvious to one of ordinary skill in the art to use the confocal microscope of Krantz to measure surface topography during inspection, in order to detect three dimensional defects or dust on specimens.

Further regarding Claim 33, the modified device of Krantz teaches automatically focusing the light energy (See Fig. 6; Col. 6, lines 37-39; see abstract).

Claims 3 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krantz (6,248,988) in view of Bishop (6,091,488) and further in view of Applicant's Addmitted Prior Art.

Regarding Claims 3 and 27, the modified device of Krantz teaches multiple element arrangement comprises a pinhole array 20 (Fig. 1). The modified device of Krantz does not teach the light source being an arc lamp. However, Applicant admits that arc lamps have been used in place of lasers in inspection devices (Spec. Page 3, lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art to provide an arc lamp in the device of modified device of Krantz, as such arc lamps are well known in the art, in order to avoid the expense of providing a laser as the light source.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krantz (6,248,988) in view of Kerstens et al. (5,248,876). and further in view of Applicant's Addmitted Prior Art.

Regarding Claim 16, the modified device of Krantz teaches multiple element arrangement comprises a pinhole array 20 (Fig. 1). The modified device of Krantz does not teach the light source being an arc lamp. However, Applicant admits that arc lamps have been used in place of lasers in inspection devices (Spec. Page 3, lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art to provide an arc lamp in the device of modified device of Krantz, as such arc lamps are well known in the art, in order to avoid the expense of providing a laser as the light source.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ishihara (5,737,084) teaches a three dimensional shape measuring apparatus with time delay and integration.

Malin et al. (5,377,002) shows a surface inspection aparatus.

Allen et al. (5,389,794) shows surface pit and mound detection.

Malin et al. (5,377,001) shows a surface inspection aparatus.

Bille et al. (4,732,473) teaches semiconductor wafer inspection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Spears whose telephone number is (703) 306-0033. The examiner can normally be reached on Monday-Friday from 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seungsook Ham can be reached on (703) 308-4090. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

STEPHONE ALLEN
PRIMARY EXAMINER

EJS
02/08/02